

**Foundations and Trends® in Technology,
Information and Operations Management**

Purchase Order Finance: A Conceptual Model with Economic Insights

Suggested Citation: Fehmi Tanrisever, Matthijs van Bergen and Matthew Reindorp (2017), "Purchase Order Finance: A Conceptual Model with Economic Insights", Foundations and Trends® in Technology, Information and Operations Management: Vol. 10, No. 3-4, Special Issue on Supply Chain Finance. Edited by P. Kouvelis, L. Dong and D. Turcic, pp 305–323. DOI: 10.1561/02000000065.

Fehmi Tanrisever

Bilkent University

Turkey

tanrisever@bilkent.edu.tr

Matthijs van Bergen

Capital Chains

The Netherlands

matthijs@capitalchains.com

Matthew Reindorp

Drexel University

USA

mjr424@drexel.edu

This article may be used only for the purpose of research, teaching, and/or private study. Commercial use or systematic downloading (by robots or other automatic processes) is prohibited without explicit Publisher approval.

now

the essence of knowledge

Boston — Delft

Contents

| | | |
|----------|---|------------|
| 1 | Introduction | 306 |
| 2 | Conceptual Model and Insights | 307 |
| 3 | Financial Intermediation | 313 |
| 4 | Current Practice | 315 |
| 4.1 | International vs. Domestic | 316 |
| 4.2 | Risk profile | 316 |
| 4.3 | Relationship between PO finance, Inventory finance and Factoring in Practice | 317 |
| 5 | Conclusions | 319 |
| | Acknowledgements | 321 |
| | References | 322 |

Purchase Order Finance: A Conceptual Model with Economic Insights

Fehmi Tanrisever¹, Matthijs van Bergen² and Matthew Reindorp³

¹*Bilkent University, Turkey; tanrisever@bilkent.edu.tr*

²*Capital Chains, The Netherlands; matthijs@capitalchains.com*

³*Drexel University, USA; mjr424@drexel.edu*

ABSTRACT

Purchase Order (PO) finance is a form of financial intermediation which can alleviate capital constraints in certain supply chains. PO finance is typically utilized by small and medium-sized enterprises (SMEs) that operate as importers, exporters, wholesalers, or distributors and have high sales growth. When applicable, PO finance creates value for the supply chain by providing capital that is not available through regular lending channels, due to informational problems. We provide a conceptual model that clarifies the value proposition of PO finance and describe how the transactions are carried out in practice. The conceptual model allows us to highlight the settings where economic conditions will favor the application of PO finance.

Fehmi Tanrisever, Matthijs van Bergen and Matthew Reindorp (2017), "Purchase Order Finance: A Conceptual Model with Economic Insights", *Foundations and Trends® in Technology, Information and Operations Management*: Vol. 10, No. 3-4, Special Issue on Supply Chain Finance. Edited by P. Kouvelis, L. Dong and D. Turcic, pp 305–323. DOI: 10.1561/02000000065.

1

Introduction

Purchase order (PO) finance is a short-term commercial financing option that provides a firm with capital to pay its suppliers, given the existence of a purchase order from a final customer. Firms that typically have greatest need for it are SMEs that operate as importers, exporters, wholesalers, or distributors and have high sales growth. This paper explains how PO finance enables access to capital markets for such firms. First we develop a conceptual model (2), which allows us to identify the parameters and decisions that govern value creation in PO finance. We then clarify the place of PO finance in the broader context of financial intermediation in the supply chain (3) and discuss the PO finance industry and PO finance transactions in practice (4). We conclude with a summary of the findings and indication of possible research directions (5).

2

Conceptual Model and Insights

There are financial firms that specialize in PO finance as well as some banks that offer it as part of their product portfolio. It is a ‘pre-shipment’ financial product, providing the applicant firm with capital to pay its suppliers before shipment of goods to the final customer occurs. By advancing funds to an applicant, PO finance has similarities to factoring; but it applies the concept even further up the value chain, since financing is provided on the basis of a purchase order from the final customer, instead of an approved invoice.

In principle, PO finance can add value to the supply chain by making transactions possible in the case that conventional financing falls short, due to informational problems. While in some cases ad-hoc solutions may be available – for example, temporarily shortening payment terms towards suppliers – our research indicates that PO finance is in practice an important and well-regarded way of giving SMEs access to working capital. We define PO finance as follows:

“Purchase order finance is a form of pre-shipment finance where an approved purchase order serves as a collateral to borrow and pay for the inputs needed to produce and/or deliver the relevant product or service.”

The impact of PO finance can be understood by comparing Figure 2.1 with Figure 2.2. Both figures show an SME that (1) needs external funds in order to (2) procure inputs from a supplier and (3) meet the demand from a corporate customer. If the capital market were perfect, investment and operating decisions of the SME would be independent of the financing decisions. As long as the investment projects of the SME generate positive NPV, there would be no financial barriers to their implementation (Hubbard, 1997; Faulkender and Petersen, 2005). In other words, the financial market would always provide adequate capital for such projects.

In the actual case of imperfect financial markets, where informational problems surrounding SMEs may be severe due to lack of an asset base that can be used as collateral (Bhidé, 2003), access to external funds may be greatly constrained for these firms (Shane, 2003). Consequently, if I^p is the optimal investment level in a perfect capital market and I^i is the investment level in an imperfect market, the relation $I^i < I^p$ will in practice generally hold. In the finance literature, this is known as the under-investment problem (Froot *et al.*, 1993). While it in principle pertains to all firms, the under-investment problem is usually more acute for SMEs, since these firms face the greatest capital market frictions. In some cases, irresolvable informational obstacles can prevent the verification of investment prospects for an SME, and access to capital for the firm may then be completely cut.

In Figure 2.1, prior to any application of PO finance, informational problems for the SME limit lending from the bank. The SME then fails to procure from its supplier and make the remaining investments required to exploit the business opportunity to sell to a corporate customer. In this example, the bank interacts solely with the SME and sets a debt limit based on the existing assets of the SME, which may be intangible and/or low in value. The business opportunity of the SME with the corporate customer cannot be verified by the bank and used as a basis for lending. Note that the capital constraint on the SME may also hurt the corporation, by limiting the supply of goods.

Figure 2.2 shows how PO finance can serve as a mechanism to mitigate informational problems. It gives the bank more visibility into

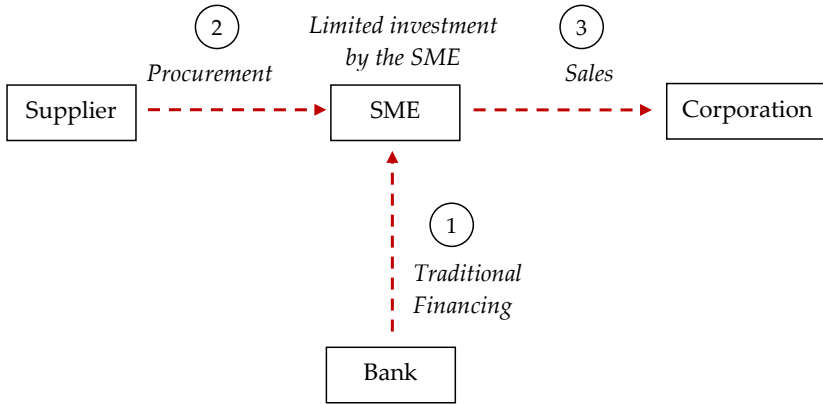


Figure 2.1: A supply chain with external financing needs

the operations and the prospects of the SME. In Figure 2, link (0) represents an informational channel that PO finance opens between the bank and the corporate customer. The corporation confirms information about its purchase order – e.g., quantities, delivery terms, quality requirements – credibly to the bank. On account of this confirmed information and the greater insight it gives to the associated potential cash flows, the bank can more easily extend credit to the SME.

The PO confirmation by the corporation mitigates the capital market frictions. The under-investment problem described earlier is partially relaxed. If I^{po} is the optimal investment level in the presence of PO finance, we will generally find $I^i < I^{po} < I^p$.

The confirmation thus has a direct effect on the investment (stocking) level of the SME. The investment level (service level) increases: a good faith PO confirmation relaxes the financial constraints for the firm. The confirmation also transfers some portion of the demand risk from the SME to the corporation. Consequently, the confirmation has both direct financial and risk-shifting benefits for the SME.

Due to the (partial) reallocation of risk, it is less straightforward to assess the benefit that the corporation may realize by making a PO confirmation. The corporation must balance two considerations. First, the PO confirmation increases the business risk for the corporation, since it may face good-faith restrictions on a radical readjustment of

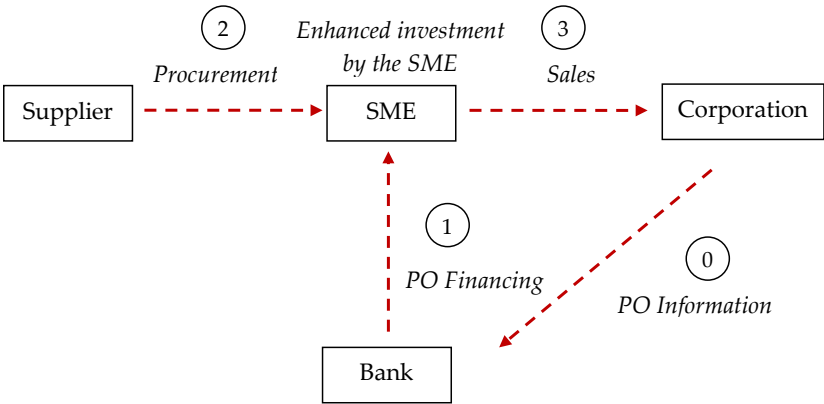


Figure 2.2: A supply chain with PO finance

purchase volumes in cases where its own final market demand proves to be disappointing. Scenarios where the PO confirmation has a negative effect on corporate profits come into the picture, even though they perhaps carry low probability. On the other hand, the PO confirmation motivates the SME to increase its investment level which increases the availability of supply for the corporation. In cases where final market demand exceeds expectations, the SME will be readily able to increase supply and corporate profits will benefit. Due to the counter-balancing effects of risk-shifting and relaxation of the supplier’s financial constraint, a PO confirmation may either increase or decrease the profits of the corporation. In this regard, formal models are needed to optimize the PO confirmation decision of the corporation while anticipating the best response of the SME. These intuitions are summarized in Table 2.1.

These effects summarized in Table 2.1 are conditioned by two key economic parameters: (1) the preexisting debt limit of the SME, L , and the creditworthiness of the corporation, $\alpha \in [0, 1]$. The debt limit reflects the severity of the ex-ante financial constraints faced by the SME. In general, a lower debt limit corresponds to a greater need for external funds. The creditworthiness of the corporation is a measure of its credit risk. The higher the creditworthiness, the higher the impact of a PO confirmation on the SME’s debt limit. If $\alpha = 1$, then the corporation is free of default risk and a PO confirmation will yield a maximal increase

Table 2.1: Effect of PO Finance on the SME and Corporation

| |
|--------------------------------|
| Effects on the SME |
| 1. Reduced operating risk |
| 2. Improved borrowing capacity |
| 3. Increased profits |

| |
|--|
| Effects on the Corporation |
| 1. Increased operating risk |
| 2. Increased SME investment giving increased service level |
| 3. Expected profits may increase or decrease |

in L . Of course, the exact increase in L that the bank will allow depends on the terms of the PO confirmation and the extent to which it places a good faith obligation on the corporation¹. In any case, $\alpha < 1$ will occur in practice. Aside from the terms of the PO confirmation, the bank will then constrain the increase L in order to account for the chance that credit problems may leave the corporation partially unable to meet its good faith confirmation. For instance, before the completion of the transaction with the SME, the corporation may itself suffer financial distress and its managers may be bound by debt covenants or court orders to alter operational decisions.

Figure 2.3 shows the impact of the PO confirmation on the profits of the corporation as a function of L and α . The corporation benefits the most from PO finance when its creditworthiness is high and the debt limit of the SME is low. In this case, the corporation can significantly increase the investment level of the SME by confirming only a relatively

¹The impact of a PO confirmation on the debt limit of the supplier also depends on the performance risk of the supplier, i.e., the uncertainty about the capabilities of the supplier to deliver upon the PO confirmation as perceived by the financial market. We assume that this parameter is included in α since its effect is similar to the creditworthiness of the corporation.

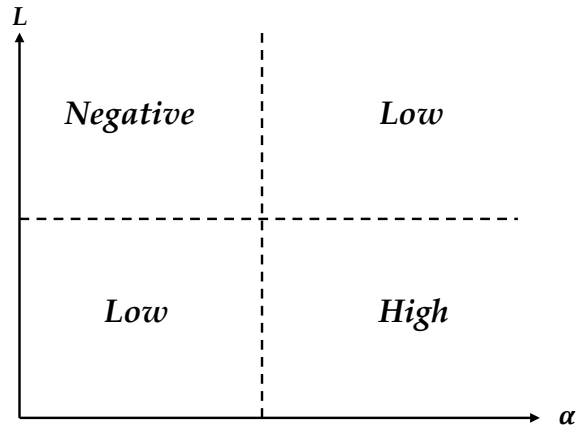


Figure 2.3: Corporation’s benefit from PO Finance as function of L and α .

modest purchase intent. When α is high but L is also high, then the SME already has little need for external funds and a PO confirmation yield little value for the corporation. When α and L are both low, the SME needs a lot of external funds, but the corporation can only facilitate this by making a stronger and firmer confirmation, since its own creditworthiness is relatively poor. This transfers a large amount of business risk to the corporation and may significantly reduce the expected value of PO finance to the corporation. Finally, when α is low but L is high, the SME needs little external funds but again the corporation needs to confirm a large purchase order, due its low creditworthiness. In this case a PO confirmation may not be advisable for the corporation, as it could entail a reduction in expected profit.

3

Financial Intermediation

PO finance fits into a set of solutions that collectively concern the financing of the supply chain (Camerinelli, 2009; Hu and Huang, 2009; Richter *et al.*, 2011). Figure 3.1 shows the position of PO finance in a supply chain transaction, in relation to other asset-based financing options for SMEs.

Factoring and reverse factoring arrangements are only available to the SME after the trade is completed between the firm and its customer, and an account receivable is created, i.e., at $t = 4$ in Figure 3.1 (Sopranzetti, 1998; Klapper, 2006; Tanrisever *et al.*, 2015). These financing options provide financing for the time period between the creation of the account receivable and the collection of cash. It is possible to initiate financing earlier (upstream) in the supply chain through asset-based lending. In this case, at $t = 3$, the SME may use goods and semi-finished goods to obtain funding (Buzacott and Zhang, 2004). PO finance, however, moves the financing point even further upstream to the point where the raw materials are acquired from the supplier, i.e. at $t = 2$. The ability to obtain earlier financing during the business cycle is of great importance for the SME, since the creation of other assets such as finished goods and accounts receivable hinges

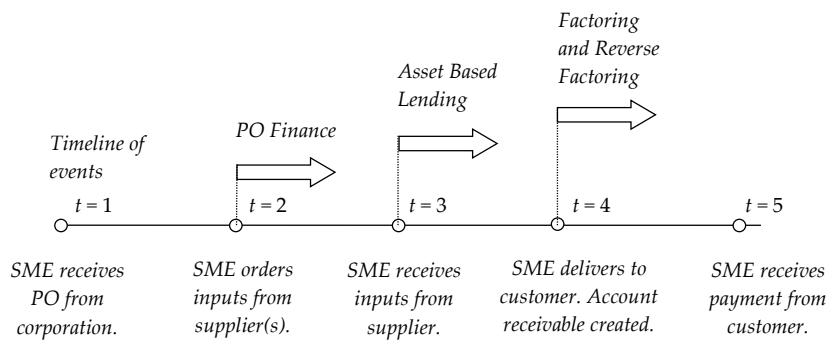


Figure 3.1: The Role of PO Finance in a Supply Chain Transaction.

on the ability to purchase raw material. If a firm cannot finance the business at $t = 2$, it is also not possible to obtain financing through asset-based lending and factoring.

Besides the need for financing, the degree of risk and informational problems quickly increases to the left in Figure 3.1. This implies more significance and value creation opportunities for financial intermediaries in the supply chain. Correspondingly, PO finance offers high expected returns to the institutions that offer it. The attendant risks and informational problems are of course also greater, which entails that financial intermediaries are extremely cautious when designing PO finance programs and selecting their SME clients.

4

Current Practice

We now consider how the conceptual elements of PO finance – informational problems, benefits, and risks – translate into industry practice. We make these elements more tangible by means of two sources of empirical data: first, trade literature and the product descriptions of providers of PO finance; second, interviews with finance professionals who have close or direct involvement with PO finance transactions. For the interviews we contacted four institutions that offer PO finance services in the Netherlands: commercial finance departments at two major banks, and two institutions that specialize in commercial finance. We were able to conduct one interview with a senior manager at each institution. The interviews were semi-structured, as follows: we presented our conceptual model and synthesis of trade literature, then asked the interviewee's assessment of the current importance of the various elements, what elements might be missing, and finally the interviewee's view of key factors affecting the evolution of the industry.

4.1 International vs. Domestic

PO finance is attractive to companies with certain characteristics. SME importers, exporters, wholesalers and distributors that encounter high sales growth, sales volatility and seasonality are the potential users. Importers experiencing high growth in business volume are indeed the most common users of PO finance. Usually these companies need more working capital than a commercial lending bank can supply, based on their current balance sheet and past sales data.

A distinction can be made between international and domestic PO finance. The complexity of an international PO finance transaction is higher, due to different payment methods, governmental regulations, longer lead-times and cultural differences. PO finance also has more potential for value creation in international contexts, due to longer cash conversion cycles and greater informational problems.

For international transactions, the methods of payment preferred by a PO financier are Letters of Credit (LC) and Documentary Collection (DC). An LC is typically an agreement between two banks, to the effect that the issuing bank will guarantee payment if pre-specified commercial conditions are met. DCs have similarities to LCs but provide less protection, which makes them cheaper. LCs are exclusively used in an international context, due to the asymmetric nature of screening tests (Ahn, 2011).

Figure 4.1 explains the process of offering PO finance, when payment is made by a Letter of Credit. Figure 4.1 is a collection of information from Eitelberg (2010) and the interviews we conducted for this research.

4.2 Risk profile

Our conceptual model indicates that the risk involved in PO finance is typically higher than the other forms of financing options such as bank loans and factoring. In PO finance there are two major categories of risk that the PO financier must evaluate: default risks and operational (performance) risks. Default risks are common with other types of lending. Since a PO financier directly funds the operations of a firm, however, operational risks become a key concern. Examples of

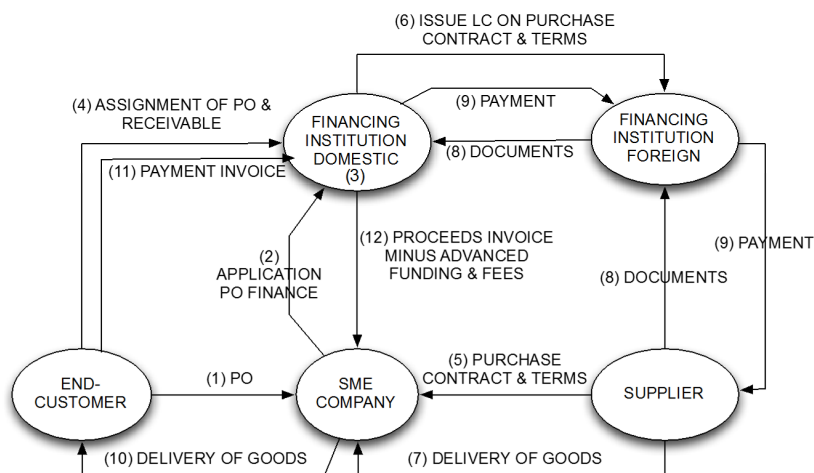


Figure 4.1: Steps in a PO finance transaction in an international context.

operational risks include changed delivery-schedules, fraud, depreciation in collateral value, insurance issues, unexpected import duties or failure to meet the quality requirements of the final customer. Such potential operational problems inflate the risk and cost of PO finance relative to other forms of lending. Nonetheless, if a firm's conventional credit capacity is exhausted, PO finance may be the only way to avoid loss of a business opportunity.

4.3 Relationship between PO finance, Inventory finance and Factoring in Practice

In the Netherlands, providers of PO finance may also offer traditional factoring services. Indeed, these institutions are only willing to provide PO finance on the condition that they will also factor the resulting receivables. This is a natural and practical condition: given the conversion process of raw materials into inventories and finally into finished products with their corresponding invoices, an institution offering PO finance and factoring literally finances the supply chain. No funding gaps will arise when PO finance is combined with inventory finance and factoring. Moreover, a claim on the underlying assets is most obvious

when the entire transaction is funded. The chance of legal ambiguities is reduced to a minimum.

Factoring services may in some cases be subject to unfavorable appraisal: descriptions such as ‘lender of last resort’ stem from past decades, when factors were likely to charge usurious rates. Factoring today is however an efficient means to obtain working capital for many companies. As factoring institutions also offer PO finance, a better image will positively benefit PO finance.

5

Conclusions

PO finance is a form of pre-shipment financing that meets an important need for firms with restricted access to capital markets. While it remains inherently more risky than mainstream commercial finance, recent technological initiatives aim to facilitate PO finance by standardizing the underlying transactions.

In this paper, we provide a conceptual model for PO finance, and explain its economic and financial role in supply chains. We first explain that PO finance exists as an economic alternative to directly lending to suppliers. This is due to informational problems and moral hazard associated with direct lending between firms. Our conceptual model then shows that the economic value of PO finance comes from its ability to mitigate informational problems between the capital market and a supplier. When a corporation confirms a purchase order, the supplier can gain access to additional funds.

The supplier not only benefits from additional financing, but also from risk-shifting to the corporation, due to the confirmation of the purchase order. The corporation also benefits from the financing effect, but may be disadvantaged by the risk-shifting effect if the confirmed quantity is too great. Hence there is a need for formal models that can

reveal the optimal purchase order confirmation for the corporation.

The impact of PO finance is also conditioned by the initial debt limit and the creditworthiness of the buyer. We expect that the value of PO finance will decrease with the initial debt limit of the supplier and increase with the creditworthiness of the buyer. Again, formal mathematical models are needed to draw conclusive results.

Acknowledgements

Financial support for this work was provided by the Dutch Ministry of Economic Affairs, via the pilot programme Service Innovation and ICT, and is gratefully acknowledged.

References

- Ahn, J. 2011. “A Theory of Domestic and International Trade Finance”. *SSRN 1974830*.
- Bhidé, A. V. 2003. *The origin and evolution of new businesses*. Oxford University Press.
- Buzacott, J. A. and R. Q. Zhang. 2004. “Inventory Management with Asset-Based Financing”. *Management Science*. 50(9): 1274–1292.
- Camerinelli, E. 2009. “Supply chain finance”. *Journal of Payments Strategy & Systems*. 3(2): 114–128.
- Eitelberg, R. 2010. “Factors and Purchase Order Financiers”. *The Secured Lender*. 66(3).
- Faulkender, M. and M. A. Petersen. 2005. “Does the source of capital affect capital structure?” *The Review of Financial Studies*. 19(1): 45–79.
- Froot, K. A., D. S. Scharfstein, and J. C. Stein. 1993. “Risk Management: Coordinating Corporate Investment and Financing Policies”. *The Journal of Finance*. 48(5): 1629–1658.
- Hu, S. and Y. Huang. 2009. “A Study of Supply Chain Finance: Its Economic Background, Innovation and Conception”. *Journal of Financial Research*. 8: 019.
- Hubbard, R. G. 1997. “Capital-market imperfections and investment”. *Tech. rep.* National Bureau of economic research.

- Klapper, L. 2006. "The role of factoring for financing small and medium enterprises". *Journal of Banking & Finance*. 30(11): 3111–3130.
- Richter, B., R. Meier, and E. Hofmann. 2011. "Supply Chain Finance: Opportunities Unchained". Capco Institute, Zurich.
- Shane, S. A. 2003. *A general theory of entrepreneurship: The individual-opportunity nexus*. Edward Elgar Publishing.
- Sopranzetti, B. J. 1998. "The economics of factoring accounts receivable". *Journal of Economics and Business*. 50(4): 339–359.
- Tanrisever, F., H. Cetinay, M. Reindorp, and J. C. Fransoo. 2015. "Reverse factoring for SME finance". *SSRN 2183991*.